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Sumio Iijima

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EXAMINER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SUMIO IIJIMA,
KATSUYUKI MURATA, KATSUMI KANEKO,
and MASAKO YUDASAKA

Appeal 2010-003574
Application 10/560,808
Technology Center 1700

Before BRADLEY R. GARRIS, TERRY J. OWENS, and
MARK NAGUMO, *Administrative Patent Judges*.

NAGUMO, *Administrative Patent Judge*.

DECISION ON APPEAL¹

¹ The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the “MAIL DATE” (paper delivery mode) or the “NOTIFICATION DATE” (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

A. Introduction^{2,3}

Sumio Iijima, Katsuyuki Murata, Katsumi Kaneko, and Masako Yudasaka (“Iijima”) timely appeal under 35 U.S.C. § 134(a) from the final rejection⁴ of claims 6-9.⁵ We have jurisdiction under 35 U.S.C. § 6. We REVERSE.

The subject matter on appeal relates to single walled carbon nanohorns on which a lanthanide metal is deposited. Such materials are said to be useful as methane-absorbent materials. Single walled carbon nanohorns are said to be similar to carbon nanotubes in that they are made from a single layer of carbon in graphitic form, but they have a “horn-like sharp-pointed conical shape at the tip end.” (Spec. 1, 2d ¶.) The carbon nanohorns are produced by laser ablation of carbon in an inert atmosphere (*id.* at para. bridging 6-7), and are generally produced as a spherical aggregate (referred to as a “dahlia-aggregate” due to its resemblance to the flower) having a diameter of about 80 to 100 nm, with the conical tip pointing outwards (*id.* at 1, 2d ¶). The aggregates are said to have a very

² Application 10/560,808, *Single Walled Carbon Nanohorn Adsorptive Material And Method For Production Thereof*, filed 20 March 2006 as the National Stage of an International Application filed 31 May 2004, claiming the benefit of an application filed in Japan on 18 June 2003. The real parties in interest are listed as the Japan Science and Technology Agency and NEC Corporation, both of Japan. (Appeal Brief, filed 25 June 2009 (“Br.”), 2.)

³ Heard 1 February 2011. The Official Transcript, which was not available when this Opinion was entered, will be made of record.

⁴ Office action mailed 15 September 2008 (“Final Rejection”; cited as “FR”).

⁵ Claims 10 and 11 stand withdrawn from consideration. (FR 1; Br. 4.)

large surface area, and to be useful as an absorptive material. (*Id.*)
Lanthanide metals are deposited by suspending the aggregates in ethanolic lanthanide nitrate solutions with sonication, followed by evaporation to dryness. (*Id.* at para. bridging 6-7.)

Representative Claim 6 reads:

6. A single walled carbon nanohorn adsorptive material
having methane adsorptivity,
wherein a lanthanide metal is deposited on a single
walled carbon nanohorn.

(Claims App., Br. 12; indentation and paragraphing added.)

The Examiner has maintained the following ground of rejection:⁶

Claims 6-9 stand rejected under 35 U.S.C. § 103(a) in view of
Kawamura.⁷

B. Discussion

Findings of fact throughout this Opinion are supported by a preponderance of the evidence of record.

The Examiner finds that Kawamura discloses fuel cell electrodes or catalysts formed from nanohorns and also comprising fullerene encapsulated lanthanum. (FR. 2; Ans. 3.) The Examiner finds further that, owing to “Van Der Wall [sic: van der Waals] forces” (*id.*), the two carbon allotropes would “conglomerate” and “the Lanthanum would be considered to be deposited on the single walled nanohorn” (*id.*). As Iijima points out, “in such [a]

⁶ Examiner’s Answer mailed 16 October 2009 (“Ans.”).

⁷ Naotake Kawamura et al., *Fuel Cell*, U.S. Patent 6,706,431 B2 (16 March 2004), based on an application filed 25 May 2001.

construct, the metal cannot interact with carbon nanohorns to change their properties since they would be shielded by fullerenes.” (Br. 9.) The Examiner has not directed our attention to any credible evidence of record that persons skilled in relevant arts would understand the requirement that “a lanthanide metal is deposited on a single walled carbon nanohorn” would be met by anything other than a lanthanide metal in direct contact with the nanohorn.

In the alternative, the Examiner argues that it would have been obvious to “maximize catalytic effect of carbon material” by providing a single walled carbon nanohorn with lanthanum. (Fr. 2; Ans. 3.) The difficulty with this argument is, as Iijima points out (Br. 9), that Kawamura does not suggest providing any material other than fullerenes with a lanthanide metal. The non-metal containing “nano-carbon materials” disclosed by Kawamura are disclosed as “hydrogen absorbable carbon material[s]” (Kawamura col. 3, ll. 44-48) or, somewhat more idiomatically, as “hydrogen storable elements” (*id.* at col. 4, ll. 20-25). The Examiner’s insistence that Kawamura at column 4, lines 50-60, discloses a catalytic effect due to carbon materials appears to be based on a misapprehension of the teachings. Kawamura teaches that platinum group metals (not lanthanides) “possess the capability of the catalytic function of separating a hydrogen molecule to a proton and an electron.” (Kawamura col. 4, ll. 25-28.) There is no disclosure that nano-carbon materials possess catalytic properties relevant to the fuel cells taught by Kawamura.

The Examiner’s argument that “methane adsorptivity [sic: absorptivity] is an [sic] inherent to the claimed material and the trait is not

otherwise indicative of patentability” (FR 3; Ans. 4) is without merit. In the present case, because the rejection is based on obviousness, not anticipation, any property of the claimed material is, at least potentially, available as evidence of nonobviousness. The Examiner has failed to direct our attention to any credible evidence of record that lanthanide metals deposited on carbon nanohorns would have been expected to lead to an increase in the methane absorption capacity of the nanohorns.

C. Order

We REVERSE the rejection of claims 6-9 under 35 U.S.C. § 103(a) in view of Kawamura.

REVERSED

sld

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